

Hamilton, (Geo.)

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THE STATUS OF PROFESSIONAL OPINION AND POPULAR SENTIMENT REGARDING SEWER-GAS AND CONTAMINATED WATER AS CAUSES OF TYPHOID FEVER:

WITH

ALLUSIONS TO A PAPER BY DR. ALFRED L. CARROLL
UPON THIS SUBJECT.

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IN the discussion following a lecture upon this subject before the College of Physicians, March 7th, by the writer, the prominent sanitary engineer, George E. Waring, declared "that the sewer-gas theory in regard to typhoid fever was, in the opinion of sanitarians, exploded." This declaration is in opposition to the teaching and recommendations of not a few engineers, who insist "that every effort should be made to exclude the gas from dwellings, regarding it as the general, if not the sole cause, not only of typhoid, but also of scarlet fever and diphtheria." This doctrine and these recommendations are in accord with the opinions, and have gained the support of a large majority of physicians. Many professors and editors of medical journals coincide with this view, and successfully impress its alleged correctness upon the minds of the inexperienced student and practitioner. Recently there appeared in a medical journal a paragraph from a somewhat prominent physician to this effect: "Is it not surprising and incomprehensible that there can yet be found physicians who deny the agency of sewer-gas in causing typhoid fever, diphtheria, and scarlet fever?" When it is stated that the writer of this quotation is one of the most positive in regarding sewer-gas as the effective agent in giving origin to the diseases named,

¹ The substance of the first portion of this paper also appeared in the Medical and Surgical Reporter for June 16, 1883.



may we not imagine another and greater surprise when he learns that the cherished and popular theory is exploded!

The paper upon sewer-gas, by Prof. Frank H. Hamilton, published some months ago in the *Popular Science Monthly*, with its numerous quotations, cannot be regarded as antagonistic to the opinions heretofore and at present held by many physicians, sanitarians, and the public generally. The special object of that paper was, in fact, to devise more reliable measures to exclude from houses this asserted source of disease; and, to accomplish this object, scientific plumbing, with improved apparatus erected in an annex, outside of the residence, was recommended. Efforts to exclude the gas are unceasing up to the present moment; neither is this strange, in view of what has just been stated. Whether the typhoid, the scarlatinal, or the diphtheritic germ, or some special quality of the gas itself, dependent upon peculiar substances finding entrance to the sewers, and subjected to various degrees of warmth and moisture, be the supposed noxious agents in question, is immaterial; for, practically, to admit the gas is to admit one or all of these agents; to exclude the gas is to exclude them. Attempts have recently been made to underrate the agency of sewer-gas in causing typhoid fever and other diseases. Efforts in this direction are doubtless made by those who frankly confess that the reports of the Board of Health of this city, New York, and elsewhere, are strongly in opposition thereto. Nor is this all; for a large majority of practitioners, who have had the most frequent and abundant opportunities to observe the origin, development, and progress of typhoid fever, either withhold their assent to the current views upon this subject or positively deny that sewer-gas is the sole cause of this fever, or that it exceeds all other agencies, combined, in its production.

In this connection, does it not seem passing strange that, while the Troussaus, the Niemeyers, the Murchisons, the Bristowes, the Flints, the Jacksons, and many others of similar experience and capacity, entertain doubts in regard to certain points pertaining to the origin of typhoid fever, and express

their opinions in relation thereto with calm, philosophic, commendable reserve, many others, of different qualifications and temperament, find no difficulty of this kind, but, on the contrary, armed *cap-à-pie*, are always ready and eager to solve any question in regard to this subject. Unfortunately, these attempted solutions are too often merely bold, positive assertions, having no real basis of support, as is exemplified in the declaration by some, "that the families located in the wealthy and fashionable parts of Philadelphia and New York, are most liable to attacks of typhoid fever;" while the reports of the Board of Health of both cities show, on the contrary, that the suburbs exhibit by far the largest number of cases. This accords perfectly with the testimony of the late distinguished Professor John K. Mitchell, quoted in my paper of the 7th of March, who, in consultation, informed the writer and the late Dr. Louis P. Gebhardt, "that he seldom saw cases of typhoid fever except on the outskirts of the city," where water-closets were scarcely known. One of the chief embarrassments of those who would fain be wise above that which is written, is to account for the greater prevalence and fatality of this disease in the country, and to avoid this difficulty, *coûte que coûte*, a reason for this must be given. To escape the dilemma in which they are placed, the drinking water in the country is declared to be contaminated from the adjacent or remote privy. Now, this assertion should, if believed, inspire far more dread than the sewer-gas theory ever did, even in its palmiest days, long before the recent decree that it had been exploded was announced. What must now be the state of mind of the laborious farmer and family in reflecting that to his own negligence or stupidity is he indebted for this sad condition of his household? But the mischief does not end here; for what, it may rationally be asked, is to become of the thousands upon thousands of our citizens who, every summer, gladly visit the country and seek boarding with the farmer, or select for a season the accommodations furnished by cottages or hotels, many of them for the express purpose of escaping, as they declare, the heated and impure air of the city, and the contaminated water of the

Schuykill, receiving, constantly, as it is said, an immense amount of impurity from Manayunk, and many other points nearer to Fairmount? As is well known, not a few of the country people, on visiting the city, alarmed by the exaggerated reports of the condition of the water, abstain as far as possible from its use. But admitting the supposition, and it is nothing more, to be true as to contamination of the water in the notably beautiful rolling country of the counties around Philadelphia, how are we to explain the fact that, at uncertain intervals, a severe epidemic will suddenly appear, fever sometimes, dysentery at other times, and will just as suddenly disappear, and neither of these diseases again be seen to any extent for one or several years; precisely as has often occurred in this city and elsewhere? To suppose that the water has thus suddenly changed from purity to impurity, and again as suddenly to purity, without perceptible or conceivable cause, either by the family physician or the family, is simply absurd.

Such a statement as was made in the discussion alluded to, regarding the condition of what were termed country towns in New England, can have but limited application, and is completely at variance with the contents of a letter from a prominent physician in a New England State, who, after inquiry in reference to outbreaks of typhoid fever, had replies from about fifty practitioners in that State to this effect, that the rural sections suffered by far the most from epidemics of typhoid fever. Any one who has travelled over the rural sections of New England could not have failed to observe the generally good condition of the farms, whatever he may have noticed of an exceptional character in some places. But why go from our own city or vicinity? Have we not in this city, or within an hour's journey, numerous factories and densely peopled districts, notorious, when compared with the country, for their filthiness; with cesspools and innumerable privies almost in contact with dwellings; and, in many cases, from the porous nature of the soil, filled to repletion, thus affording every opportunity for the contamination of the water in comparison with the country?

To show how delusive plausibly written accounts of the origin and spread of typhoid fever may be, let the following suffice: A woman, after nursing a relative during several weeks, returned, after the death of the patient, to her own residence, distant three miles. In a few days she was prostrated with typhoid fever, the disease of the relative. In succession one after another was attacked until four out of seven members of the family were down with the disease, one death ensuing from perforation. In the discussion of the paper one of the speakers thought there could be no difficulty in accounting for the attacks of the last three patients, as the dejections from the bowels of the first patient were (probably) cast down in such way as to admit of drainage into the drinking-water, and that thus the typhoid germs were received into the stomachs of those last attacked. But, unfortunately for this solution, the drainage descended from the source of the water to the outhouse.

In another family of eight persons, quoted in the lecture of March 7th, seven were attacked with the fever, all of them dangerously, except a colored servant. As in the former case the disease did not originate upon the premises. A son had been sent to Maryland—distance forty miles—and after remaining there several weeks was brought home, affected with typhoid fever; and in succession his two brothers, two sisters, and last of all, his father and the servant were attacked. The dwelling was upon the slope of a hill, and, as in the former case, the drainage descended from the water in the direction of the outhouse; so that contamination of the water in either instance was impossible. Typhoid and scarlet fever, diphtheria and dysentery may not, under favorable conditions, be contagious; but under opposite conditions, as when these diseases are malignant, and the patients crowded together—for example, three in the same room—as occurred in the family just alluded to, they are regarded by an immense majority of the most able, unprejudiced, and experienced physicians as eminently contagious.

Colonel Waring, to his credit be it said, was commendably conservative in the discussion, not disposed to be dogmatic,

and, in regard to this special point, said that "the literature of the subject *seems* to prove that typhoid fever in the country is due to drinking-water which has become contaminated," knowing, doubtless, full well that a score of probabilities are powerless when confronted by a single irrefutable fact.

To revert for a moment to sewer-gas, it appears from the remarks of one of the disputants to be now placed in a worse position than ever; for while it is admitted to be the *vehicle for conveying typhoid germs, when it contains them (?)* it is also declared to be "the most potent cause of the typhoid state." The importance of this statement will be at once appreciated when we call to mind that the typhoid condition is the almost invariable concomitant of the latter stages of nearly all dangerous and fatal diseases, whether acute or chronic. During the discussion repeated appeals were made on behalf of cleanliness. But who ever heard of any one, who had the least regard to the amenities of life, opposed to cleanliness? for is it not said to be "akin to godliness?"

The criticisms by Dr. Alfred L. Carroll upon my lecture of March 7th, published in THE MEDICAL RECORD of June 9th, are, the writer thinks, rendered in great measure nugatory by certain uncontroverted and incontrovertible facts above stated; yet special notice will now be taken in reference to some points in the critique.

The diagnosis of typhoid fever is declared by Dr. C. to be unsettled. But why so? Is it because it has been known to appear suddenly upon a mountain-peak in Tennessee or Western Virginia, in their almost pristine condition, far removed from sewers, or "the walled-up and leaching privies of cities or of filthy villages," where some may say it should not have appeared; or, on the other hand, in the filthiest of cities in Asia and Africa it rarely appears, despite the filth and stench for which they are noted. The diagnosis depends upon no contingent, exceptional features in its history. Who that has ever read Louis, Andral, or Chomel, or Bartlett in our own country, and, in an especial manner, the works of that master-mind in medicine, Austin Flint, Sr., could say that the diagnosis of

this disease is unsettled? Like very many other affections, either from idiosyncrasy, or complications, doubts may arise; yet this militates not against its normal aspect, one of most singular and pronounced character, so that he who is familiar with the disease will incur slight risk of a mistake in diagnosis. Error as to frequency and fatality in town or country is impossible, if statistics are consulted.

Dr. C. asserts that sanitarians have not ascribed prominence to sewer-gas as a cause of typhoid fever. The facts above stated on this point prove the contrary. According to Dr. C. a majority of cases of this disease have been *accurately* traced to contaminated food and water; yet in my own extensive experience not one such case has (to my knowledge) ever occurred, and those reported are probably in the same predicament as those alluded to in the discussion as referable to contaminated water. The term sewer-gas is said to be misinterpreted, but is it not just as definite in signification as the terms spring-water, sea-water, river-water, mountain air, etc.? Next it is declared that "the filth of the country is atrocious, compared with that of the city, and that for one source of filth in the city there are three in the country; and that one prolific cause of this may be found in the numerous unventilated vaults." In reply to this sum of abominations of the country and villages, compared with a city, the writer must declare that, after ten years of practice in the country, he has seen nothing that could present the shadow of a parallel to the statement just made. On the contrary, a walled, unventilated well was scarcely ever seen in the rural section where he practised, but in lieu thereof a simple fosse, not very deep, was dug, and from time to time the contents covered with fresh earth and in the fall or winter removed to the fields. This then is just the condition that Dr. C. regards as involving only slight danger, while the walled-up, unventilated privy is a nuisance worthy of the severest denunciation. Where then do we find these dangerous wells in great number? As every one knows, in the cities, and in many cases, as in Philadelphia and New York, reaching to tens of thousands.

In my lecture it was stated that in "not more than one house out of five could any sign of sewer-gas be detected." This, of course, had reference to the city, not the country. While Dr. C. is quite excusable for this oversight, his thrust at the country physicians, in declaring that very few of them care to *learn how* to look for the causes of disease, may not be regarded in so favorable light, especially when we reflect that Rousseau designated the country physician as in the best position by far to discover the origin, development, and progress of typhoid fever; and truth compels me to assent to this declaration. In forty years of city practice no such opportunities for observing the origin and character of the disease were afforded the writer as during his ten years of country practice; and this may well appear from the fact that, in city practice, only one case in a family has occurred—three families alone excepted, in two of which two, and in the third family, four persons were affected. In this connection it may be stated that in the course of twelve months four cases of intestinal perforation occurred in my practice.

Dr. C. most truly informs us, "that facts are more forcible than words;" and what sane man can object to this forcible truism? Let us, however, put to the scrutiny a fact or two adduced: "Agricultural laborers," he tells us, "do not spend all their time in the fields," for they need sleep, and, thus far, very good. But when he asserts that "as a class they carefully exclude all ventilation from their rooms," we must dissent, *toto coelo*. The most laborious and exhausting work of the laborer is during the hot weather of the harvest-time, and, as a rule, he is apt to retire early in the evening. But, unfortunately, the room of the laborer is very often in the upper story or garret, and this very frequently is without ceiling, and the rays of the sun pouring down upon the roof during the long days of summer, renders the atmosphere of the room in a measure stifling; and, instead of excluding the air, he longs for the excessive heat of his room to pass away, as experience tells him it will, just as the night passes away, and the well-known refreshment of the morning hours draws near. In this connec-

tion it should be noted, that when epidemic dysentery prevails (in the country), many of the attacks are attributed to the excessive change of temperature from the early night to the morning hours, causing (during sleep) sudden and violent retrocession from the cutis to the abdominal organs. Healthy young males are said by Dr. C. to be especially prone to attacks of the fever, and here, we think, he is right, although in opposition to the view of Dr. F. H. Hamilton; but if, as he asserts, fragile women are better able to resist *infection* than strong women or men, it is contrary to general experience; for debility, no matter how produced, increases the liability to such infection or contagion; while it must be confessed that males or females of moderate physical conformation, if healthy, support acute diseases better, and are more likely to escape a fatal termination than the rugged and over-sanguine. Facts that have the *appearance* of causes are alluded to; but these, although constantly brought forward, can have, and should have but slight influence in determining questions of serious importance; for one proven, irrefutable fact, in contravention, outweighs a score of them.

About two columns of THE RECORD are taken up with a list of houses in which typhoid fever or diphtheria occurred. Every one of these houses, whether large, elegant, and furnished with conveniences, or small, and of an opposite character, had this in common, that in regard to filth, in one form or another they were simply abominations, and hence, were just the places (as many think) for an outbreak of these diseases, of which six were typhoid fever; and let it be borne in mind that Dr. C. has excluded cases where contaminated water might be thought to have had some influence in causing these outbreaks. But what of all this? If eleven cases of typhoid fever, as stated above, could occur in only two houses, having no such abominations of filth, nor of contaminated drinking-water, why may they not occur in houses such as Dr. C. describes? for, beyond all question, filth should confer no exemption from these attacks. Dr. C. intimates that persons who are habituated to the influence of agents productive of typhoid fever are seldom quite

well, and, on the contrary, my experience is that young and healthy men are, especially in the country, attacked despite their actual good health.

In connection with, and conclusion of this subject, the writer must again put on record the testimony of Dr. John Syer Bristow, President of the Society of Medical Officers of Health, confessedly one of the most sagacious observers and logical thinkers of the day, who writes as follows: "If we look to the remarkable influence which *simple variations of temperature and peculiarities of season* exert on the mortuary returns, in respect both of the number of deaths and the character of the fatal diseases, and compare therewith the comparatively small effect on the death-rate of even one of the most fatal of the zymotic diseases, or with the insignificant influence of deaths from enteric fever, diphtheria, and other affections, *over which sanitary science is supposed to exert a specially valuable influence*, we can scarcely avoid seeing that, on similar grounds, the deaths saved directly by the sanitary labors on which we are engaged must, under any circumstances, be so few annually as to produce *no distinct and unmistakable effect on the mortuary rate.*"

This sincere and ingenuous avowal of opinion by one, not only distinguished as an author and teacher, but who, in his exalted official position, had every opportunity to scrutinize all facts regarding outbreaks of typhoid fever, scarlet fever, and diphtheria, as bearing upon the question of their prevention, may well be commended to the serious consideration of those who, for years past, have positively promised the extinction of these diseases, under certain impossible conditions, yet with no other result than that just presented by the above-named conscientious and eminent authority in medical science.

